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Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/WNo.14/KRIDL/GSB-1/2015-16 Date : 07.04.2015

GRADATION FOR GSB (CLOSE GRADED)
IS : 2720 (Part - 4)

Client : **Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, Bangalore.

Name of Work : Re-Asphalting Cross Roads & Re-Construction of drains at Kirloskar Layout in Ward No. 14, BBMP, Bangalore.

Reference : BBMP/DZ/AEE/TDSD/PR/2015-16 Dated: 04.04.2015

Date of Testing : 07.04.2015

Sample Source : GSB, Mix plant Bangalore **Oven Dry Wt (gm) :** 25365

TABLE – 1

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Specified Limits
75.0	0	0	0.00	100	100
53.0	1847	1847	7.28	92.72	80-100
26.50	4998	6845	26.99	73.01	55-90
9.50	3984	10829	42.69	57.31	35-65
4.75	5016	15845	62.47	37.53	25-55
2.36	2895	18740	73.88	26.12	20-40
0.425	3212	21952	86.54	13.46	10-25
0.075	2056	24008	94.65	5.35	3-10
PAN	1357				
Total	25365				

Remarks: Satisfies MORTH Specifications as per Table 400-1, Grading I

Note:

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Job No.: CTCE/BBMP/WNo.14/KRIDL/GSB-1/AL/2015-16 Date : 07.04.2015

ATTERBERG LIMITS TEST FOR GSB (CLOSE GRADED)
IS : 2720 (Part - 5)

Client : **Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, Bangalore.

Name of work : Re-Asphalting Cross Roads & Re-Construction of drains at Kirloskar Layout in Ward No. 14, BBMP, Bangalore.

Reference : BBMP/DZ/AEE/TDSD/PR/2015-16 Dated: 04.04.2015

Date of Testing : 07.04.2015

As per MORTH Table : 400-1

Sl. No.	Particulars	Test Results	Standards as per Specifications
1	Liquid Limit, %	21.65	25.0% Maximum.
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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Job No.: CTCE/BBMP/W.No.14/KRIDL/WMM/Gradation/2015-16

10.04.2015

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, Bangalore.

Name of Work : Re-Asphalting Cross Roads & Re-Construction of drains at Kirloskar Layout in Ward No. 14, BBMP, Bangalore.

Reference : BBMP/DZ/AEE/TDSD/PR/2015-16 Dated: 04.04.2015

Date of Testing : 10.04.2015

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **28645**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	1015	1015	3.5	96.5	95-100
22.4	9026	10041	35.1	64.9	60-80
11.2	5114	15155	52.9	47.1	40-60
4.75	4010	19165	66.9	33.1	25-40
2.36	3462	22627	79.0	21.0	15-30
0.600	2148	24775	86.5	13.5	8-22
0.075	2345	27120	94.7	5.3	0-8

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Job No.: CTCE/BBMP/W.No.14/KRIDL/WMM/AIV/2015-16 10.04.2015

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Re-Asphalting Cross Roads & Re-Construction of drains at Kirloskar Layout in Ward No. 14, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/TDSD/PR/2015-16 Dated: 04.04.2015
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	10.04.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	382	385	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	81	84	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines	21.20	21.82	
	100* (W_2/W_1)%			**21.51**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.14/KRIDL/WMM/Shape.T/2015-16 : 10.04.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager (West),** KRIDL, Bangalore.
Name of Work	: Re-Asphalting Cross Roads & Re-Construction of drains at Kirloskar Layout in Ward No. 14, BBMP, Bangalore.
Reference	: BBMP/DZ/AEE/TDSD/PR/2015-16 Dated: 04.04.2015
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Wet Mix Macadam
Date of Testing	: 10.04.2015

Result : Flakiness Index = **11.78%**

Elongation Index = **13.36%**

Result : Combined Flakiness & Elongation index **25.14%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.14/KRIDL/QB/2015-16 20.04.2015

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

CUSTOMER	:	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	:	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	:	Re-Asphalting Cross Roads & Re-Construction of drains at Kirloskar Layout in Ward No. 14, BBMP, Bangalore.
REFERENCE	:	BBMP/DZ/AEE/TDSD/PR/2015-16 Dated: 04.04.2015
SAMPLE ID	:	Bitumen
DATE OF SAMPLING	:	16.04.2015
DATE OF TESTING	:	20.04.2015

The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	86	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	47	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	300	Min. 220

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Job No.: CTCE/BBMP/W.No.14/KRIDL/BM/Bitumen/2015-16 22.04.2015

BITUMEN CONTENT DETERMINATION OF BITUMINOUS MACADAM MIX

AS per IRC:SP:-1984

CLIENT	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Re-Asphalting Cross Roads & Re-Construction of drains at Kirloskar Layout in Ward No. 14, BBMP, Bangalore.
REFERENCE	BBMP/DZ/AEE/TDSD/PR/2015-16 Dated: 04.04.2015
SAMPLE I/D	Roads in Kirloskar Layout, Ward No. 14
DATE OF TESTING	22.04.2015

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	482.5	482.5
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	17.5	17.50
7. Bitumen content in %	3.50	3.50
8. Average	**3.50**	

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Job No.: CTCE/BBMP/W.No.14/KRIDL/BM/Gradation/2015-16 22.04.2015

GRADATION DETERMINATION OF BITUMINOUS MACADAM MIX

As per IS2386 and IRC:SP:11-1984

CLIENT	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Re-Asphalting Cross Roads & Re-Construction of drains at Kirloskar Layout in Ward No. 14, BBMP, Bangalore.
REFERENCE	BBMP/DZ/AEE/TDSD/PR/2015-16 Dated: 04.04.2015
SAMPLE I/D	Roads in Kirloskar Layout, Ward No. 14
DATE OF TESTING	22.04.2015

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GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-04 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
26.5	0	0	0	100	100
19	35.26	7.31	7.31	92.69	90-100
13.2	113.98	23.62	30.93	69.07	56-88
4.75	241.24	50.00	80.93	19.07	16-36
2.36	51.23	10.62	91.55	8.45	4-19
0.3	14.68	3.04	94.59	5.41	2-10
0.075	8.15	1.69	96.28	3.72	0-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-04 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
26.5	0	0	0	100	100
19	28.86	5.98	5.98	94.02	90-100
13.2	103.57	21.47	27.45	72.55	56-88
4.75	239.64	49.67	77.11	22.89	16-36
2.36	48.12	9.97	87.09	12.91	4-19
0.3	21.27	4.41	91.49	8.51	2-10
0.075	11.16	2.31	93.81	6.19	0-8

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Job No.: CTCE/BBMP/W.No.14/KRIDL/BM/Bitumen/2015-16 23.04.2015

BITUMEN CONTENT DETERMINATION OF BITUMINOUS MACADAM MIX

AS per IRC:SP:-1984

CLIENT	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Re-Asphalting Cross Roads & Re-Construction of drains at Kirloskar Layout in Ward No. 14, BBMP, Bangalore.
REFERENCE	BBMP/DZ/AEE/TDSD/PR/2015-16 Dated: 04.04.2015
SAMPLE I/D	Roads in Kirloskar Layout, Ward No. 14
DATE OF TESTING	23.04.2015

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	482.5	482
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	17.5	18.00
7. Bitumen content in %	3.50	3.60
8. Average	**3.55**	

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GRADATION DETERMINATION OF BITUMINOUS MACADAM MIX

As per IS2386 and IRC:SP:11-1984

CLIENT	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Re-Asphalting Cross Roads & Re-Construction of drains at Kirloskar Layout in Ward No. 14, BBMP, Bangalore.
REFERENCE	BBMP/DZ/AEE/TDSD/PR/2015-16 Dated: 04.04.2015
SAMPLE I/D	Roads in Kirloskar Layout, Ward No. 14
DATE OF TESTING	23.04.2015

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-04 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
26.5	0	0	0	100	100
19	36.53	7.57	7.57	92.43	90-100
13.2	116.28	24.10	31.67	68.33	56-88
4.75	245.12	50.80	82.47	17.53	16-36
2.36	53.57	11.10	93.58	6.42	4-19
0.3	15.36	3.18	96.76	3.24	2-10
0.075	6.54	1.36	98.11	1.89	0-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-04 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
26.5	0	0	0	100	100
19	31.57	6.55	6.55	93.45	90-100
13.2	102.84	21.34	27.89	72.11	56-88
4.75	242.15	50.24	78.12	21.88	16-36
2.36	48.65	10.09	88.22	11.78	4-19
0.3	18.67	3.87	92.09	7.91	2-10
0.075	11.21	2.33	94.42	5.58	0-8

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BITUMEN DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AS per IRC : SP : 11 - 1984

CLIENT	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Re-Asphalting Cross Roads & Re-Construction of drains at Kirloskar Layout in Ward No. 14, BBMP, Bangalore.
REFERENCE	BBMP/DZ/AEE/TDSD/PR/2015-16 Dated: 04.04.2015
SAMPLE I/D	Roads in Kirloskar Layout, Ward No. 14
DATE OF TESTING	24.04.2015

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474.5	474.5
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25.5	25.50
7. Bitumen content in %	5.10	5.10
8. Average	**5.10**	

Note:

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Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/Gradation/2015-16 24.04.2015

GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS : 2386 and IRC : SP : 11 - 1984

CLIENT	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Re-Asphalting Cross Roads & Re-Construction of drains at Kirloskar Layout in Ward No. 14, BBMP, Bangalore.
REFERENCE	BBMP/DZ/AEE/TDSD/PR/2015-16 Dated: 04.04.2015
SAMPLE I/D	Roads in Kirloskar Layout, Ward No. 14
DATE OF TESTING	24.04.2015

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	26.18	5.52	5.52	94.48	90-100
4.75	251.94	53.10	58.61	41.39	35-51
2.36	52.38	11.04	69.65	30.35	24-39
1.18	27.83	5.87	75.52	24.48	15-30
0.3	57.48	12.11	87.63	12.37	9-19
0.075	36.95	7.79	95.42	4.58	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	32.37	6.82	6.82	93.18	90-100
4.75	256.25	54.00	60.83	39.17	35-51
2.36	43.85	9.24	70.07	29.93	24-39
1.18	42.15	8.88	78.95	21.05	15-30
0.3	32.76	6.90	85.85	14.15	9-19
0.075	40.67	8.57	94.43	5.57	3-8

Note:

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ಸಹಾಯಕ ಕಾರ್ಯನಿರ್ವಾಹಕ ಅಭಿಯಂತರರು
ಬಿಬಿಎಸಪಶ್ಚಿಮ ಉಪ-ವಿಭಾಗ
ಬ್ಯಾಗಲಗುಂಟೆ, ಬಿಬಿಎಂಪಿ
ಬೆಂಗಳೂರು

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CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/Bitumen/2015-16 25.04.2015

BITUMEN DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AS per IRC : SP : 11 - 1984

CLIENT	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Re-Asphalting Cross Roads & Re-Construction of drains at Kirloskar Layout in Ward No. 14, BBMP, Bangalore.
REFERENCE	BBMP/DZ/AEE/TDSD/PR/2015-16 Dated: 04.04.2015
SAMPLE I/D	Roads in Kirloskar Layout, Ward No. 14
DATE OF TESTING	25.04.2015

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474.5	475
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25.5	25.00
7. Bitumen content in %	5.10	5.00
8. Average	**5.05**	

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GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS : 2386 and IRC : SP : 11 - 1984

CLIENT	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Re-Asphalting Cross Roads & Re-Construction of drains at Kirloskar Layout in Ward No. 14, BBMP, Bangalore.
REFERENCE	BBMP/DZ/AEE/TDSD/PR/2015-16 Dated: 04.04.2015
SAMPLE I/D	Roads in Kirloskar Layout, Ward No. 14
DATE OF TESTING	25.04.2015

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	24.86	5.24	5.24	94.76	90-100
4.75	247.96	52.26	57.50	42.50	35-51
2.36	53.62	11.30	68.80	31.20	24-39
1.18	50.34	10.61	79.41	20.59	15-30
0.3	27.89	5.88	85.28	14.72	9-19
0.075	39.43	8.31	93.59	6.41	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	33.15	6.98	6.98	93.02	90-100
4.75	258.63	54.45	61.43	38.57	35-51
2.36	55.23	11.63	73.05	26.95	24-39
1.18	41.27	8.69	81.74	18.26	15-30
0.3	24.63	5.19	86.93	13.07	9-19
0.075	36.35	7.65	94.58	5.42	3-8

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Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/Bitumen/2015-16 27.04.2015

BITUMEN DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AS per IRC : SP : 11 - 1984

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REFERENCE	BBMP/DZ/AEE/TDSD/PR/2015-16 Dated: 04.04.2015
SAMPLE I/D	Roads in Kirloskar Layout, Ward No. 14
DATE OF TESTING	27.04.2015

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	475
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	25.00
7. Bitumen content in %	5.00	5.00
8. Average	**5.00**	

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GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

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SAMPLE I/D	Roads in Kirloskar Layout, Ward No. 14
DATE OF TESTING	27.04.2015

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	25.53	5.37	5.37	94.63	90-100
4.75	248.46	52.31	57.68	42.32	35-51
2.36	56.87	11.97	69.65	30.35	24-39
1.18	53.64	11.29	80.95	19.05	15-30
0.3	28.79	6.06	87.01	12.99	9-19
0.075	38.46	8.10	95.11	4.89	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	35.82	7.54	7.54	92.46	90-100
4.75	258.47	54.41	61.96	38.04	35-51
2.36	53.96	11.36	73.32	26.68	24-39
1.18	43.24	9.10	82.42	17.58	15-30
0.3	26.85	5.65	88.07	11.93	9-19
0.075	29.65	6.24	94.31	5.69	3-8

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